



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/825,800	04/14/2004	Darrin Leonhardt	N.C. 95,876	1602

26384 7590 01/17/2006

NAVAL RESEARCH LABORATORY
ASSOCIATE COUNSEL (PATENTS)
CODE 1008.2
4555 OVERLOOK AVENUE, S.W.
WASHINGTON, DC 20375-5320

EXAMINER

MCDONALD, RODNEY GLENN

ART UNIT	PAPER NUMBER
----------	--------------

1753

DATE MAILED: 01/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/825,800	Applicant(s) LEONHARDT ET AL.	
	Examiner Rodney G. McDonald	Art Unit 1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 November 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-7 and 19-25 are rejected under 35 U.S.C. 102(b) as being anticipated by ***Theoretical overview of the large-area plasma processing system (LAPPS)*** by Manheimer et al. (Manheimer).

3. For claim 1, Applicant requires a large area metallization pretreatment and surface activation system comprising a gas or gas mixture; an electron beam source; a low electron plasma of pre-determined width, length, thickness, and location relative to a surface, wherein the plasma sheet is produced by the electrode beam passing through the gas or gas mixture; a substrate to be treated; wherein the radical and ion flux from the plasma is controlled to chemically and physically alter the surface of the substrate thereby improving the ability of a film to adhere to the substrate; wherein the radical and ion flux from the plasma is controlled by selecting an appropriate gas mixture based on the desired surface pretreatment and by altering the separation between the plasma sheet and the substrate.

4. For claim 19, Applicant requires a method of producing a chemically active surface to improve the ability of a film to adhere to a substrate, comprising the steps of producing a low electron plasma of pre-determined width, length, thickness, and

location relative to a surface by passing an electron beam through a gas or gas mixture; and controlling the radical and ion flux from the plasma to chemically and physically alter the surface of a substrate thereby improving the ability of a film to adhere to the substrate; wherein the radical and ion flux from the plasma is controlled by selecting an appropriate gas mixture based on the desired surface pretreatment and by altering the separation between the plasma and the substrate.

5. Manheimer discloses a LAPPS system comprising a sheet electron beam (abstract), gas for a plasma (abstract), formed plasma (abstract), and substrate (abstract). The surface of the substrate is altered by the radical and ion flux and are controlled based upon the desired pretreatment (abstract).

6. For claims 2 and 20, Applicant requires the width to be much larger than the thickness of the beam. The beam is a sheet beam and inherently larger in width than thickness (abstract).

7. For claims 3 and 21, Applicant requires magnetic means for confining the electron beam. Manheimer discloses applying a longitudinal magnetic field (pg. 372).

8. For claims 4 and 22, Applicant requires the position of the beam, plasma and substrate to be adjustable. Because the substrate can be rotated or moved on a continuous feed belt (pg. 372), it is adjustable.

9. For claims 5 and 23, Applicant requires the substrate to be electrically biased. A DC bias is applied to the substrate (pg. 371).

10. For claims 6 and 24, Applicant requires the gas to comprise at least one molecular gas. Manheimer uses oxygen (pg. 371).

11. For claims 7 and 25, Applicant requires roll-to-roll spools to feed the substrate. Manheimer uses a continuous feed belt (pg. 372) and hence discloses the limitations.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 8-14, 16-18, 26-32, and 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over ***Theoretical overview of the large-area plasma processing system (LAPPS)*** by Manheimer et al. (Manheimer) in view of US 5,089,066 to Hamada et al. (Hamada).

14. For claims 8 and 26, Applicant requires providing a second gas and a target wherein the plasma is sputtered with the second gas to sputter material from the target and deposit as a thin film onto the substrate.

15. For claims 14 and 32, Applicant requires conventional plasma vapor depositing onto the substrate with the material generated by sputtering means or vaporization means.

16. Manheimer is described above, but does not disclose depositing a layer onto the pretreated substrate. Manheimer does, however, indicate that the pretreatment is to be used before conventional plasma processing such as etching or deposition (pg. 370).

17. Hamada discloses various deposition techniques that can be used after a substrate is pretreated include sputtering, CVD, or other deposition techniques. The

Art Unit: 1753

sputtering involves providing a sputtering target that is biased and sputtering in an argon gas (col. 6, l. 57-68).

18. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Manheimer to utilize sputtering or CVD as deposition techniques after the plasma pretreatment because of the knowledge that such deposition techniques are conventional after pretreatment.

19. For claims 9 and 27, Applicant requires the target to be biased above a sputtering threshold. The limitation is inherent in Hamada because otherwise, the target could not be sputtered and emit atoms.

20. For claims 10, 17, 28, and 35, Applicant requires the electron beam and plasma to be located between the target and substrate. The limitations are inherent because if the plasma were above the target or under the substrate, there could be no deposition. Regarding the electron beam, if it were not between the target and substrate, then the target or substrate would block its path to the substrate.

21. For claims 11, 18, 29, and 36, Applicant requires the position of the beam, plasma, target, and substrate to be adjustable. Because the substrate moves on a roll to roll system, it is adjustable.

22. For claims 12 and 30, Applicant requires the second gas to be atomic or molecular or a mixture. Argon is used in Hamada and hence, the limitation is met.

23. For claims 13 and 31, Applicant requires a roll-to-roll spool to feed the substrate. As noted above, Manheimer discloses the limitation.

Art Unit: 1753

24. For claims 16 and 34, Applicant requires the vaporization means to be electron beams, lasers or thermal sources. Hamada discloses using an electron gun or resistance heating to deposit (col. 7, l. 1-20).

25. Claims 15 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over ***Theoretical overview of the large-area plasma processing system (LAPPS)*** by Manheimer et al. (Manheimer) in view of US 5,089,066 to Hamada et al. (Hamada) as applied to claims 14 and 32 above, and further in view of US 5,178,739 to Barnes et al. (Barnes).

26. For claims 15 and 33, Applicant requires the sputtering means to be magnetrons or ion beams.

27. Manheimer in view of Hamada is described above, but the sputtering means being magnetrons is not described.

28. Barnes discloses that when sputtering, it is beneficial to have magnets behind the sputtering target, hence magnetrons, for the purpose of increasing sputtering rate and plasma density (col. 4, l. 16-25).

29. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Manheimer in view of Hamada to utilize magnetrons behind the target because of the desire to increase the sputtering rate.

Response to Arguments

Applicant's arguments filed November 15, 2005 have been fully considered but they are not persuasive.

In response to the argument that Manheimer's theoretical system does not suggest the larger area system or method for large area metallization pretreatment and surface activation, it is argued that Manheimer's teaching shows a system in Figure 1 capable of controlling the ion and free radical bombardment of a substrate in a large area. Such treatment could include pretreatment before conventional plasma processing such etching. Clearly the system of Figure 1 which is not a theoretical system and has been utilized by Manheimer suggest Applicant's system. (See Manheimer discussed above)

In response to the argument that Applicant does not necessarily require a magnetic field for their invention, it is argued that the claims as presented are open to using a magnetic field or not using a magnetic field. Therefore use of Manheimer's magnetic field would be acceptable. Furthermore, Applicant can use a magnetic field and Manheimer does suggest this. (See Manheimer discussed above)

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

Art Unit: 1753

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M- Th with Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Rodney G. McDonald
Primary Examiner
Art Unit 1753

RM
January 10, 2006